**SFP-OC-12-CW-55-80-I-AL-AO**

Alcatel-Lucent Nokia® Compatible TAA OC-12-CWDM SFP Transceiver (SMF, 1550nm, 80km, LC, DOM, -40 to 85C)

**Features:**

- Class 1 Laser Safety
- CWDM Wavelengths, Uncooled DFB Laser
- SFP MSA Compliant
- Duplex LC Connector
- Single 3.3V Power Supply
- Up to 2.67Gbps Bi-Directional Data Links
- Operating Temperature: -40 to 85 Celsius
- Hot-Pluggable
- Excellent ESD Protection
- RoHS Compliant and Lead-Free
- RoHS Compliant and Lead Free



**Applications:**

- OC-12 Transmission

**Product Description**

This Alcatel-Lucent Nokia® compatible SFP transceiver provides OC-12 (622 mbs) CWDM transmission rates for up to 80km over single-mode fiber (SMF) using a wavelength of 1550nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Alcatel-Lucent Nokia® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. It is built to meet or exceed the specifications of Alcatel-Lucent Nokia®, as well as to comply with MSA (Multi-Source Agreement) standards to ensure seamless network integration. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

AddOn's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products."

TAA COMPLIANT

**CWDM Available Wavelengths**

| Wavelengths | Min. | Typ. | Max. |
|---|---|---|---|
| **45** | 1444.5 | 1451 | 1457.5 |
| **47** | 1464.5 | 1471 | 1477.5 |
| **49** | 1484.5 | 1491 | 1497.5 |
| **51** | 1504.5 | 1511 | 1517.5 |
| **53** | 1524.5 | 1531 | 1537.5 |
| **55** | 1544.5 | 1551 | 1557.5 |
| **57** | 1564.5 | 1571 | 1577.5 |
| **59** | 1584.5 | 1591 | 1597.5 |
| **61** | 1604.5 | 1611 | 1617.5 |

**Absolute Maximum Ratings**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Operating Case Temperature** | Tc | -40 | 25 | 85 | °C | |
| **Storage Temperature** | Tstg | -40 | | 85 | °C | |
| **Relative Humidity** | RH | 5 | | 95 | % | |
| **Supply Voltage** | Vcc | -0.5 | | 4.0 | V | |
| **Data Rate** | DR | | | 2.67 | Gbps | |

**Electrical Characteristics**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Power Supply Voltage** | Vcc | 3.135 | 3.3 | 3.465 | V | |
| **Power Supply Current** | Icc | | | 450 | mA | |
| **Power Dissipation** | PD | | | 1500 | mW | |
| **Transmitter Differential Input Voltage (TD +/-)** | | 300 | | 2200 | mVp-p | 1 |
| **Receiver Differential Input Voltage (TD +/-)** | | 600 | | 1200 | mVp-p | 2 |
| **Low-Speed Output: Transmitter Fault (Tx_Fault)/Loss of Signal (LOS)** | VOH | 2.0 | | Vcc | V | 3 |
| | VOL | 0 | | 0.8 | V | |
| **Low-Speed Input: Transmitter Disable (Tx_Disable), MOD_DEF1, MOD_DEF2** | VIH | 2.0 | | Vcc | V | 4 |
| | VIL | 0 | | 0.8 | V | |

**Notes:**

1. Internally AC coupled and terminated to 100Ω differential load.
2. Internally AC coupled but requires a 100Ω differential termination or internal to serializer/de-serializer.

3. Pulled up with a 4.7kΩ to 10kΩ resistor on the host board to VccT, VccR.
4. MOD_DEF1 and MOD_DEF2 must be pulled up extremely with a 4.7kΩ to 10kΩ resistor on the host board to VccT, VccR.

**Optical Characteristics**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| **Center Wavelength** | λC | λ-6.5 | λ | λ+6.5 | nm | |
| **Launch Optical Power** | Po | 0 | | 5 | dBm | |
| **Extinction Ratio** | ER | 8.2 | | | dB | |
| **Spectral Width (-20dB)** | Δλ | | | 1 | nm | |
| **Side-Mode Suppression Ratio** | SMSR | 30 | | | dB | |
| **Total Jitter** | TJ | | | 40 | ps | |
| **Dispersion Penalty** | TDP | | | 2 | dB | |
| **Optical Rise/Fall Time** | Tr/Tf | | | 160 | dB | |
| **POUT @Tx_Disable Asserted** | Poff | | | -45 | dBm | |
| **Eye Diagram** | SONET OC-48/ SDH STM-16 Compatible | | | | | |
| **Receiver** | | | | | | |
| **Receiver Sensitivity** | S | | | -29 | dBm | 1 |
| **Receiver Overload** | POL | -9 | | | dBm | 1 |
| **Optical Return Loss** | ORL | 27 | | | dB | |
| **LOS Assert** | LOSA | -45 | | | dBm | |
| **LOS De-Assert** | LOSD | | | -60 | dBm | |
| **LOS Hysteresis** | LOSH | 0.5 | 3 | 5 | dB | |

**Notes:**

1. Measured with PRBS$2^{23}$-1 test pattern, @2.488Gbps, ER=8.2dB, and BER<$10^{-12}$.

**Pin Descriptions**

| Pin | Symbol | Name/Description | Plug Seq. | Notes |
|---|---|---|---|---|
| **1** | VeeT | Transmitter Ground. | 1 | |
| **2** | Tx_Fault | Transmitter Fault Indication. | 3 | 1 |
| **3** | Tx_Disable | Transmitter Disable. Module disables on “high” or “open.” | 3 | 2 |
| **4** | MOD_DEF2 | Module Definition 2. 2-Wire Serial ID Interface. | 3 | 3 |
| **5** | MOD_DEF1 | Module Definition 2. 2-Wire Serial ID Interface. | 3 | 3 |
| **6** | MOD_DEF0 | Module Definition 0. Grounded within the module. | 3 | 3 |
| **7** | Rate Select | Not Connected. | 3 | |
| **8** | LOS | Loss of Signal. | 3 | 4 |
| **9** | VeeR | Receiver Ground. | 1 | |
| **10** | VeeR | Receiver Ground. | 1 | |
| **11** | VeeR | Receiver Ground. | 1 | |
| **12** | RD- | Receiver Inverse Data Out. | 3 | 5 |
| **13** | RD+ | Receiver Data Out. | 3 | 5 |
| **14** | VeeR | Receiver Ground. | 1 | |
| **15** | VccR | 3.3 ± 5% Receiver Power. | 2 | 6 |
| **16** | VccT | 3.3 ± 5% Transmitter Power. | 2 | 6 |
| **17** | VeeT | Transmitter Ground. | 1 | |
| **18** | TD+ | Transmitter Data In. | 3 | 7 |
| **19** | TD- | Transmitter Inverse Data In. | 3 | 7 |
| **20** | VeeT | Transmitter Ground. | 1 | |

**Notes:**

1. Tx_Fault is an open collector/drain output that should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When “high,” output indicates a laser fault of some kind. “Low” indicates normal operation. In the “low” state, the output will be pulled to <0.8V.
2. Tx_Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7kΩ to 10kΩ resistor. Its states are:

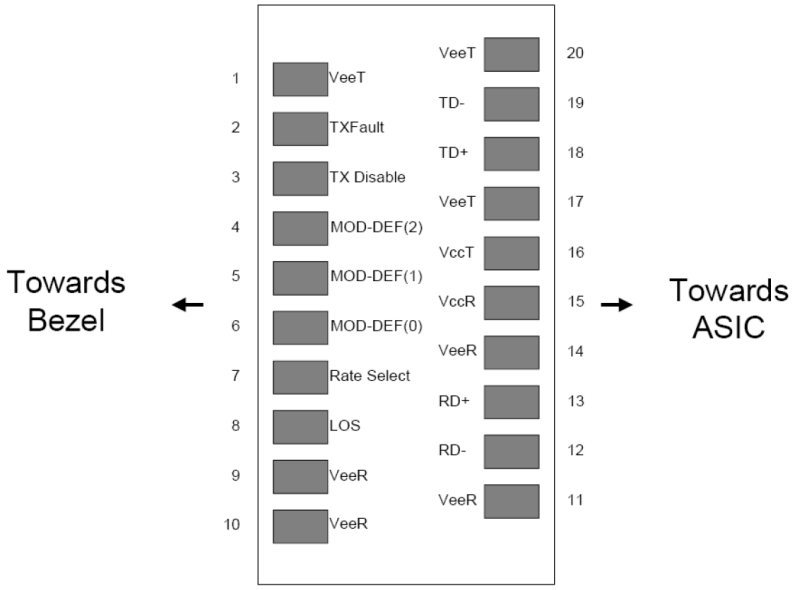
   Low (0V – 0.8V): Transmitter On
   (>0.8V, <2.0V): Undefined
   High (2.0V – 3.465V): Transmitter Disabled
   Open: Transmitter Disabled.
3. MOD_DEF0, 1, & 2. These are the module definition pins. They should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board to supply VccT+0.3V or VccR+0.3V.

   MOD_DEF0 is grounded by the module to indicate that the module is present.
   MOD_DEF1 is the clock line of 2-wire serial interface for optional serial ID.
   MOD_DEF2 is the data line of 2-wire serial interface for optional serial ID.
4. LOS (Loss of Signal) is an open collector/drain output that should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When “high,” this output indicates that

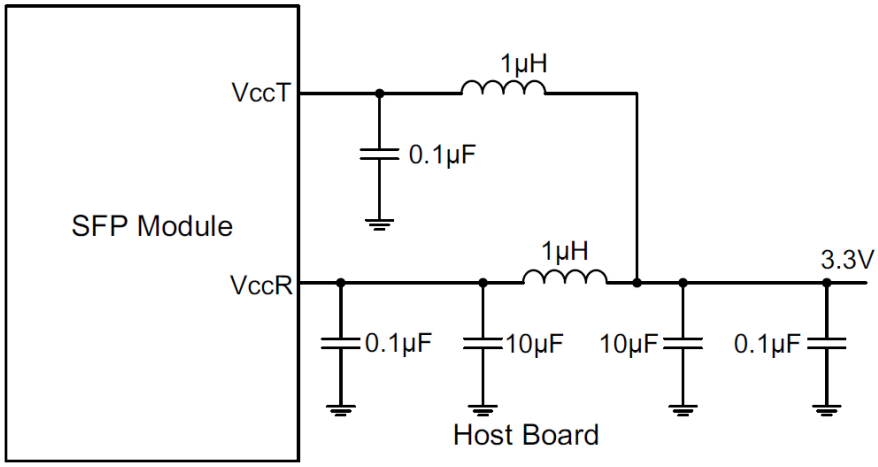
the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). “Low” indicates normal operation. In the “low” state, the output will be pulled to <0.8V.

5. RD-/+. These are the differential receiver outputs. They are AC-coupled, 100Ω differential lines that should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
6. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ± 5% at the SFP connector pin. The in-rush current will typically be no more than 30mA above steady supply current after 500ns.
7. TD-/+. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

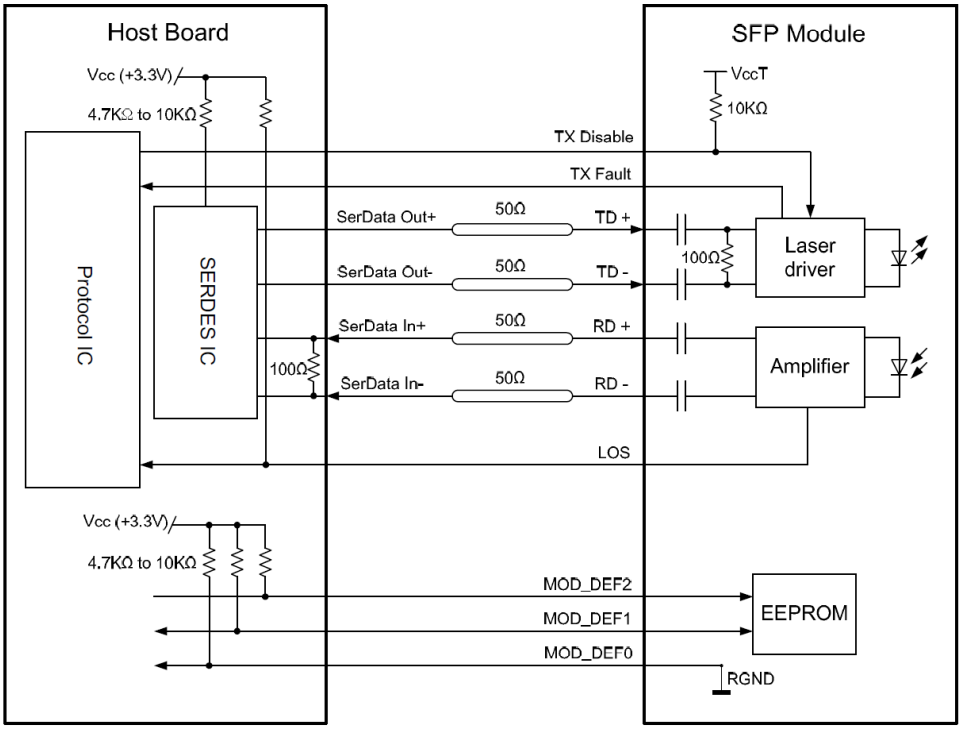
**Electrical Pad Layout**



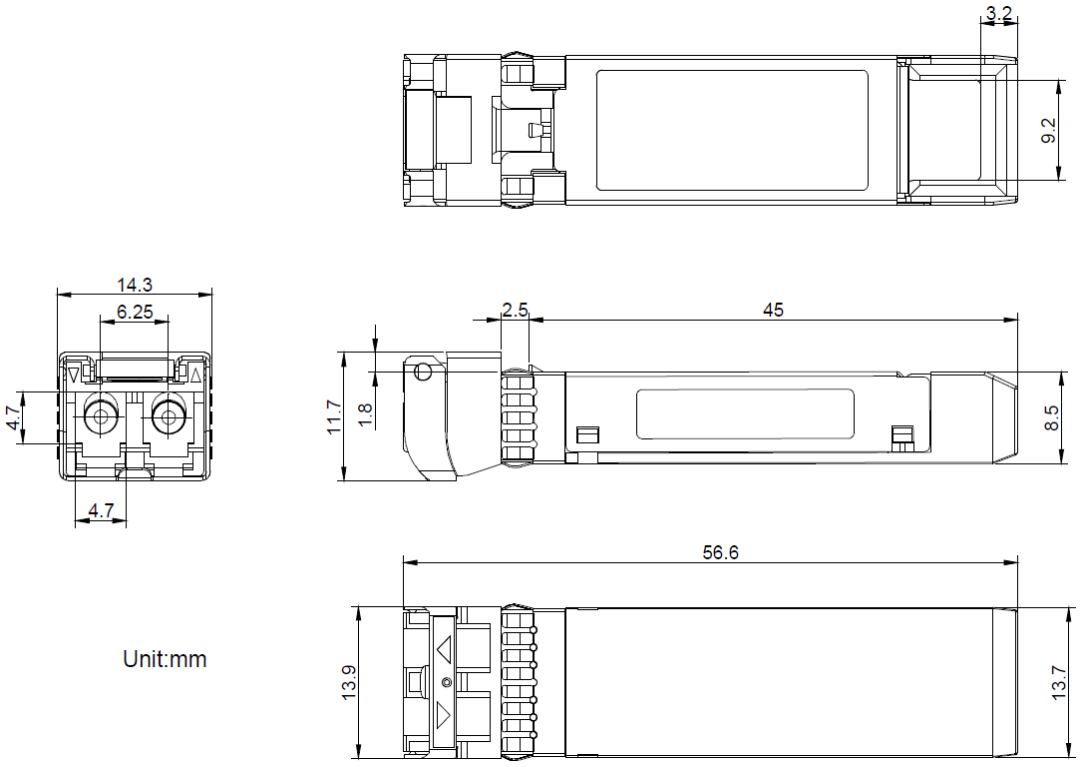

**Recommended Host Board Power Supply Circuit**



## Recommended Circuit Schematic




## Mechanical Specifications



**About AddOn Networks**

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications ranging from NEBS Level 3 to ISO 9001:2015 with every new development while maintaining the signature reliability of its products.




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